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(56) Documents Cited

GB 0686598 A DE 004132958 A1 US 5082132 A  
US 3825215 A

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(54) Abstract Title

Shock absorber for actuator of pedal bin

(57) A shock absorber 20 is adapted for connection to actuating means 19 of a pedal bin so as to damp opening and closing movement of its lid 7, and especially to reduce the force and thus the noise with which the lid closes. The shock absorber comprises a plastics body 21 containing an air bellows 34 of flexible plastics, the top end of which engages in a recess of a planar member 36 connected to rod 19 of the lid-actuating means. The bottom end of the bellows has an orifice (28) for entry and exit of air, a spigot (29) being gravity-biased to close the orifice. The bin may also have wheels 18 and a vertical door mounted on hinges 5.

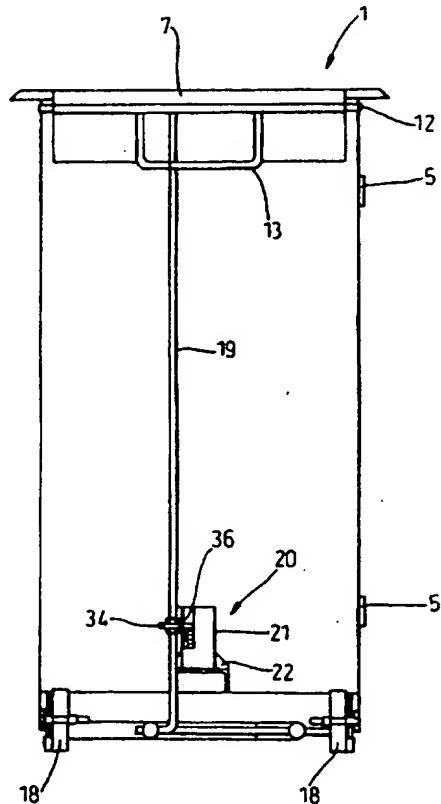
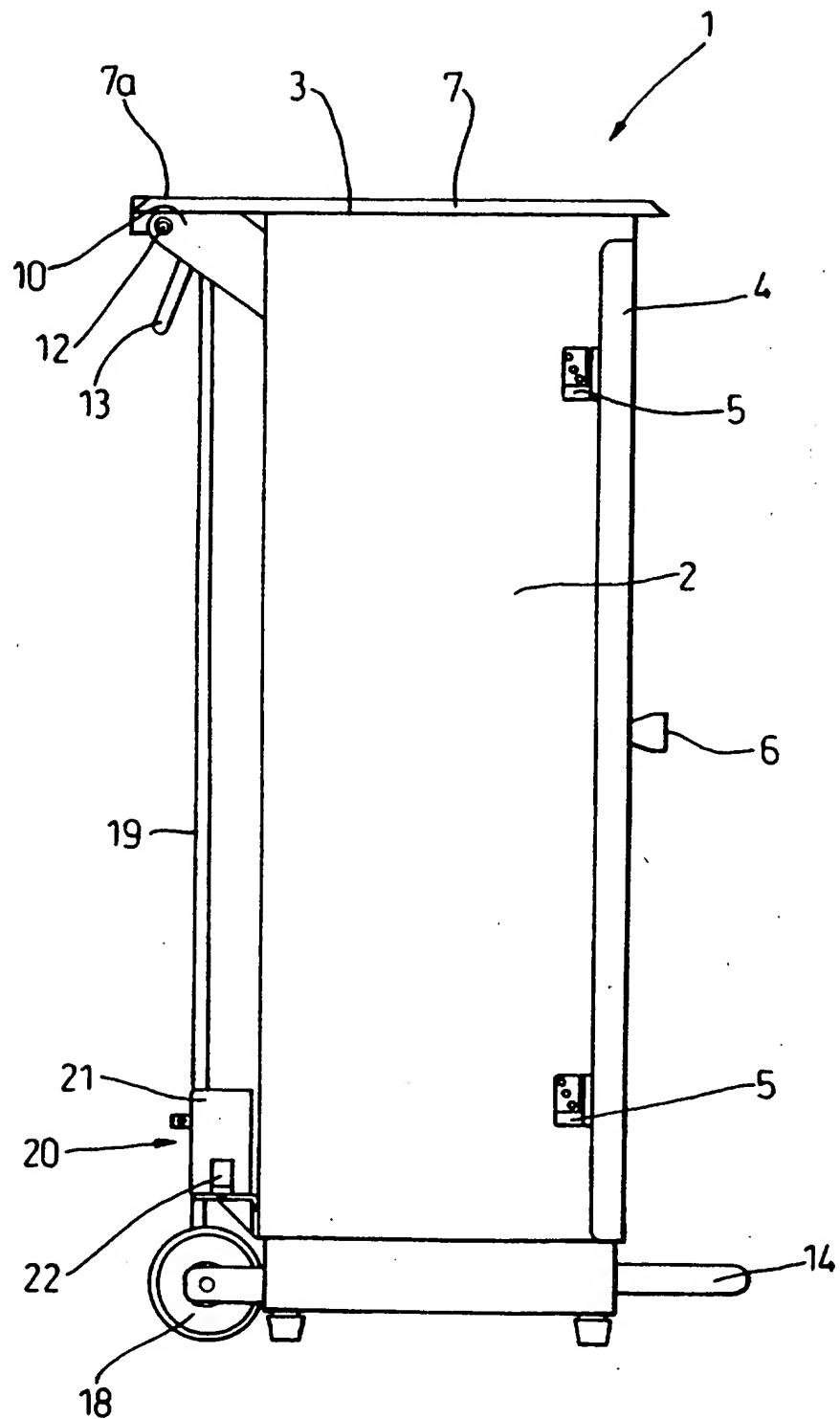


Fig. 1a

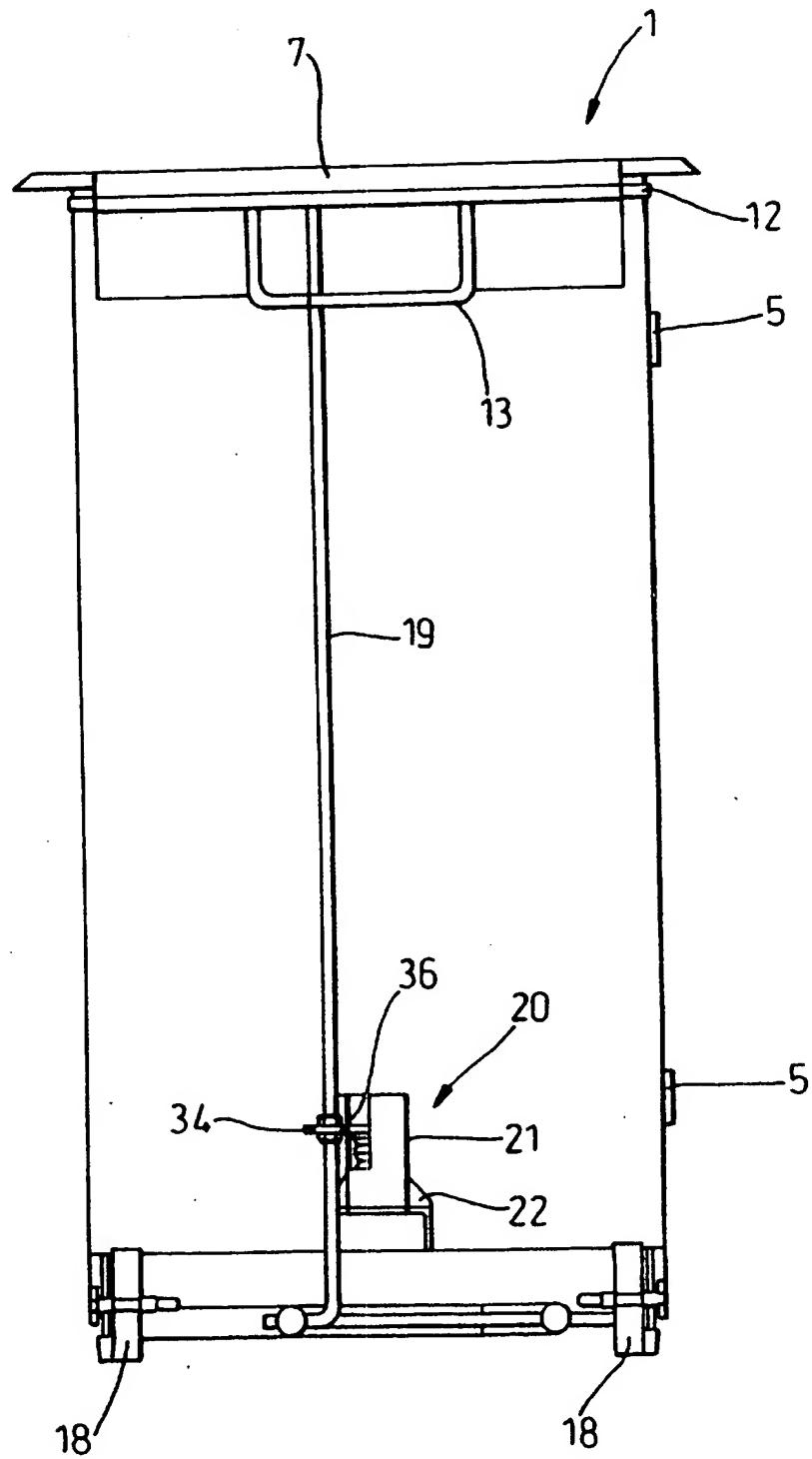
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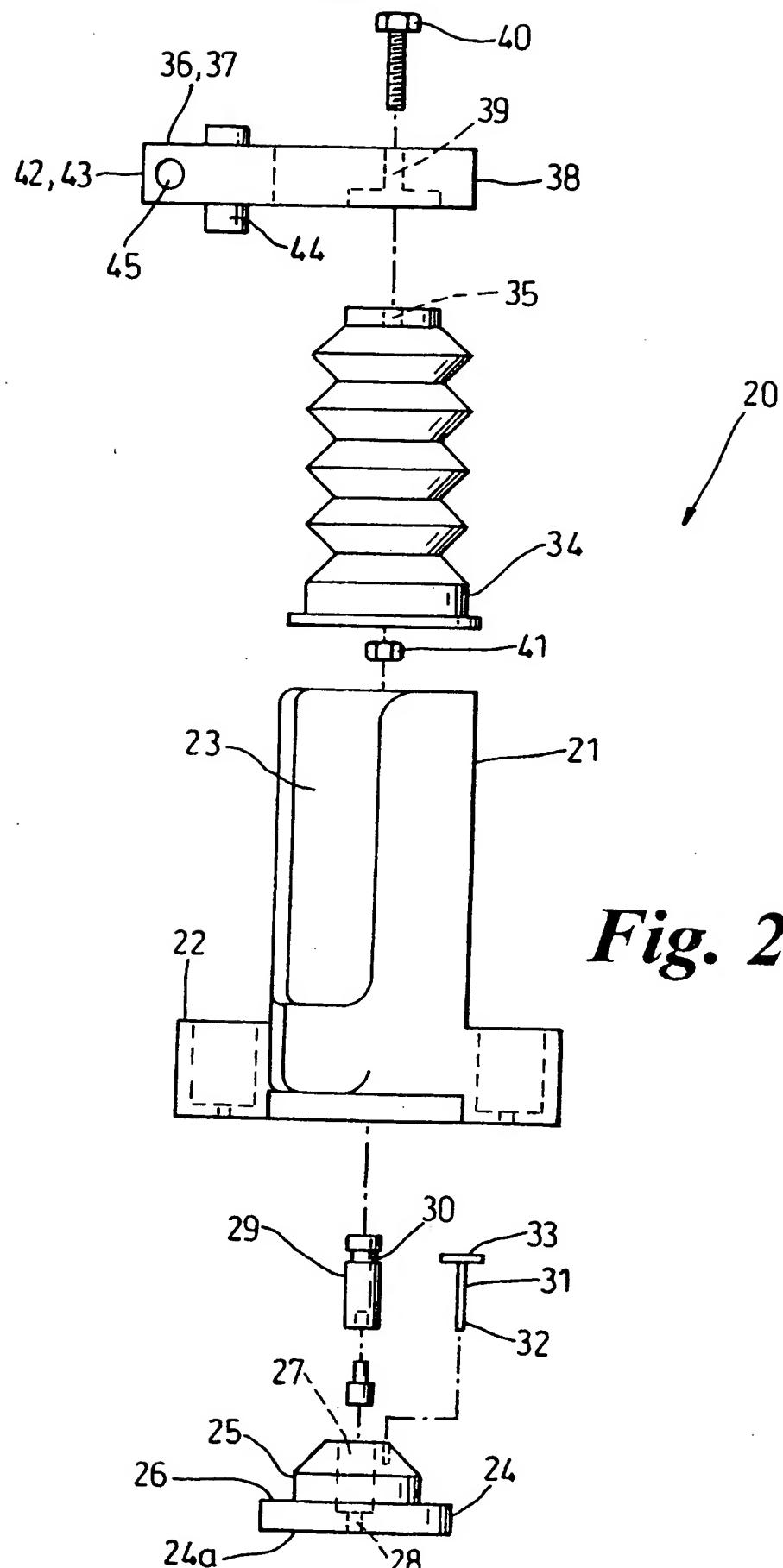
**Fig. 1**

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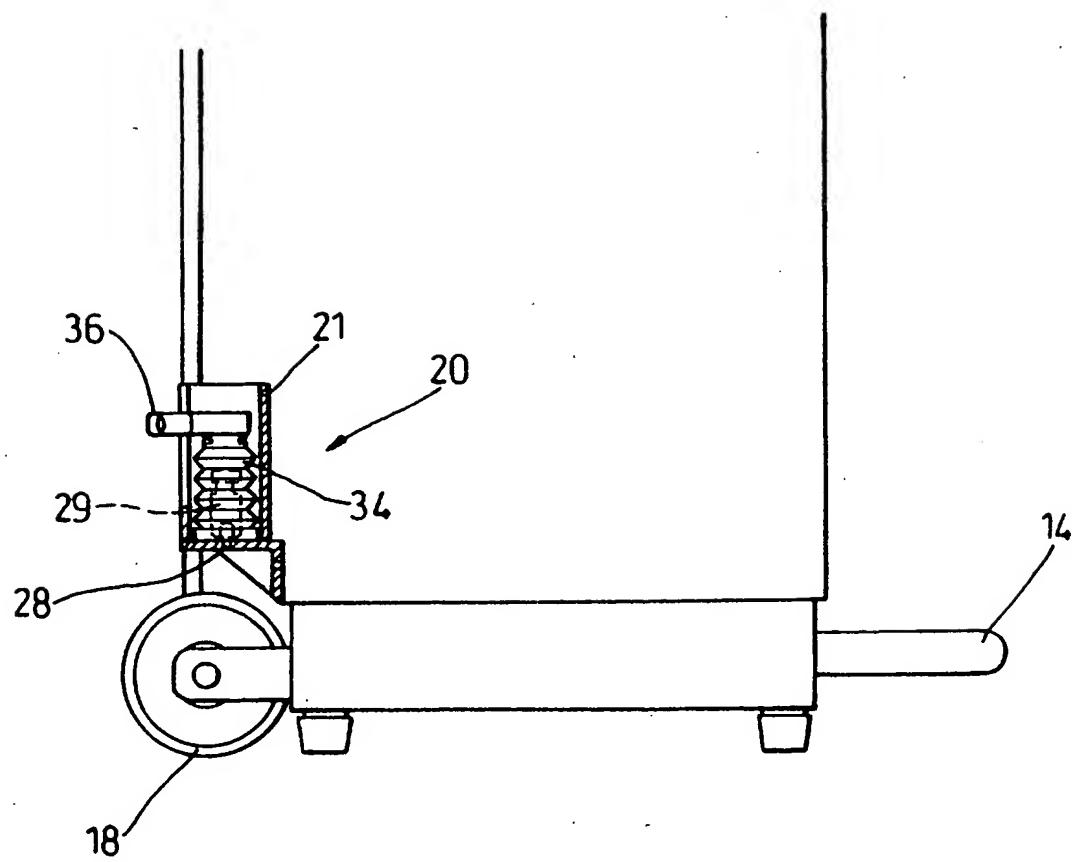
***Fig. 1a***

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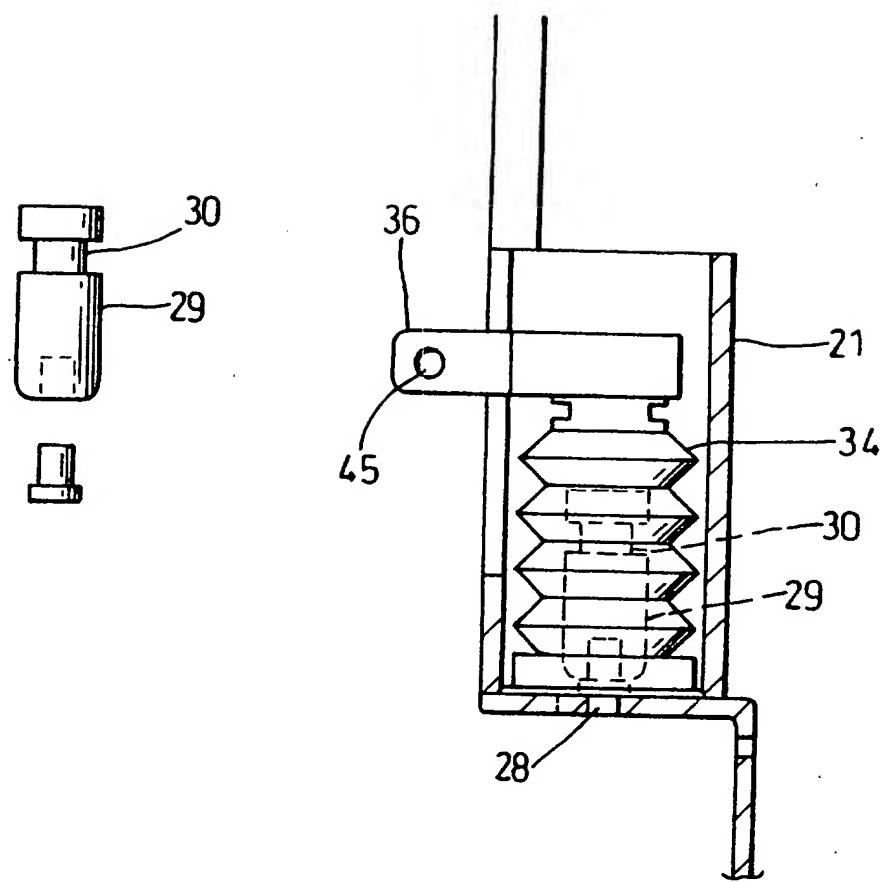
*Fig. 2*

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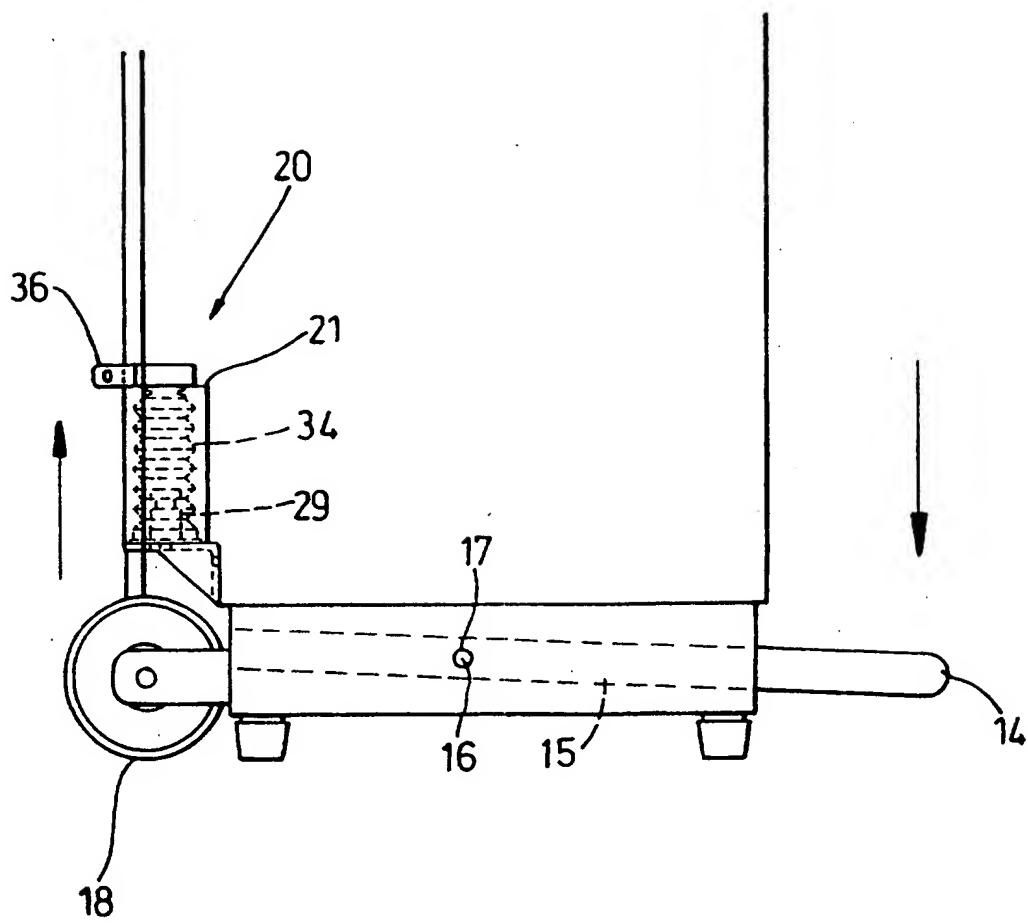
***Fig. 3***

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*Fig. 3a*

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***Fig. 4***

SHOCK ABSORBER

5 This invention relates to a shock absorber and, more particularly, to a shock absorber for use in a pedal bin to reduce the force with which the lid of the bin is returned to the closed condition during use.

10 Pedal bins are found in many different locations and have a particular usefulness in a hospital environment where a lid is required on the bin to keep any material in the bin isolated from the patients in the hospital. Pedal bins allow the operator to open the lid of the bin without having to manually operate the lid. This is particularly useful when the 15 operator is carrying waste to be put into the bin and does not have a free hand.

20 The bins are operated by a pedal at the foot of the bin which is generally depressed in order to raise the lid of the bin. Once material has been placed into the bin, the pedal is released thereby allowing the lid to fall back onto the bin under the force of gravity. Whilst this ensures that the bin 25 is closed securely, the noise generated from such an action can cause a disturbance. This is especially so where a number of such bins are provided in one room, for example in a hospital. Here it is imperative to ensure that the patients are not disturbed more than is necessary.

30 It is an object of the present invention to provide a shock absorber for a pedal bin which is both efficient and quiet in closing the lid of a bin after use, thereby overcoming or at least mitigating the disadvantages of the known pedal bins.

35 According to one aspect of the present invention there is provided a shock absorber adapted for use on a pedal bin in which the lid of the pedal bin is opened and closed by an actuating member, the shock absorber comprising damping means

connected to the actuating means to limit the speed of movement of the actuating means when the lid of the bin is opened or closed.

5 Preferably, the shock absorber further comprises a body which is adapted to be mounted on the bin adjacent to the actuating means of the bin, the damping means being mounted within the body.

10 Advantageously, the damping means comprises bellows mounted which may expand or retract within the body.

Conveniently, means are provided to connect the bellows to the actuating member of the bin.

15 Advantageously, the connecting means comprises a planar member, one end of which is provided with a recess to receive the actuating member and the other end of which is connected to the leading end of the bellows.

20 Preferably also, the recess is defined between two arms of the planar member and means are provided to alter the distance between the two arms thereby altering the size of the recess to allow the connecting means to be securely affixed to the actuating means of the bin.

25 Advantageously, the body of the shock absorber is provided with a longitudinal slot along at least part of the length thereof, through which the planar member extends as the bellows are expanded and retracted within the body.

30 Conveniently, the body is provided with an end cap closing the end of the body remote from the planar member.

35 Advantageously, the end cap comprises an integrally formed hollow boss which extends into the body and is received within the free end of the bellows.

Preferably also, an aperture is formed in outer surface of the end cap allowing air to be drawn into the hollow boss.

Conveniently, a weight is provided within the boss, the weight being moveable between a position wherein the aperture in the end cap is closed by the weight and a position where the weight is lifted free of the aperture to allow air to be drawn into the boss.

Advantageously, a limit stop is mounted on the boss to limit the movement of the weight between the two extreme positions.

Preferably, the body is formed of a rigid plastics material.

Preferably also, the bellows are formed of a resilient plastics material.

One embodiment of the present invention will now be described with reference to the accompanying drawings in which:

Figure 1 is a schematic side view of a pedal bin with a shock absorber according to one aspect of the present invention mounted thereon;

Figure 1a is a schematic rear view of the bin of Figure 1;

Figure 2 is an exploded side view of the shock absorber of Figure 1;

Figure 3 is a schematic side view of the shock absorber of Figure 1 when the lid of the bin is in a closed condition, and

Figure 3a is an enlarged view of the shock absorber  
as shown in Figure 3;

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Figure 4 is a schematic side view of the shock  
absorber of Figure 1 when the lid of the bin is in  
an opened condition.

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Turning now to the Figures there is shown in Figure 1 a  
pedal bin generally referred to as 1. The pedal bin comprises  
a hollow body 2 with an opening 3 at one end which may be  
adapted to receive a waste receptacle such as a plastics waste  
bag for rubbish (not shown). The bin may be formed of a  
moulded plastics material.

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The bin is provided with a hinged door 4 at the front  
thereof. This allows access to the bag when full, to allow  
the bag to be removed from the bin and a new bag to be mounted  
within the body of the bin. The door is hinged 5 at one side  
to the body. A door knob 6 is mounted on the door  
approximately mid-way between the top and bottom of the door  
adjacent the edge remote from the hinges 5.

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The bin 1 is provided with a lid 7 which covers the  
opening 3 in the body. The lid extends 7a beyond the rear of  
the bin and has a downward projecting lip 8 at the rear edge.  
The lip is extended 8a, 8b around the sides of the lid which  
extend beyond the rear of the bin. An aperture 9 is provided  
through the lip at each side of the lid.

30

A pair of generally triangular flanges 10 extend upward  
from the rear of the bin 1. The flanges are mounted to the  
bin adjacent the top edge and extend outwardly from the bin to  
a position level with the top edge of the bin and adjacent to  
the end of the lid 7.

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The flanges 10 are each provided with an aperture 11  
which is of a similar size to the aperture 9 in the lip of the  
lid. A mounting pin 12 extends through the apertures in the

flanges and the lip of the lid to hingedly connect the lid 7 to the bin 1.

5 A handle 13 is provided adjacent the rear of the lid of the bin, between the flanges 10.

10 At the base of the bin, the pedal 14 comprises a substantially rectangular plate 15 which is mounted underneath the bin. The front of the plate extends beyond the front of the bin. The plate is pivotally mounted to the underside of the bin on a pivot pin 16 which is retained in two apertures 17 in the sides of the lower section of the bin.

15 At the rear of the bin a wheel 18 is mounted at either side to enable the bin to be tilted back onto the wheels to allow the bin to be easily moved from one location to another.

20 An actuating rod 19 is mounted at the rear of the bin. The rod is centrally located between the wheels 18 at the base of the bin and extends between the rear of the rectangular plate 15 and the underside of the lid 7 between the flanges 10.

25 A shock absorber 20 according to one aspect of the present invention is mounted between the base of the bin 1 and the actuating rod 19 as shown in Figure 1. The shock absorber comprises a circular shroud 21, open at both ends and provided with integrally formed mountings 22 at one end to allow the shroud to be mounted to the rear of the bin 1. The shroud may 30 be formed of any suitable plastics material and may be formed a known molding process.

35 A generally rectangular U-shaped slot 23 is provided in the shroud, the slot extending approximately three quarters of the length of the shroud and off-set from the centre of the shroud, towards one of the mountings 22 as shown in Figure

An end cap 24 is mounted in the lower end of the shroud 21 to close the lower side of the shroud. The end cap is generally circular and is of a similar diameter to the diameter of the shroud itself.

A hollow boss 25 extends from the centre of the end cap and is adapted to be received within the shroud 21. The boss is generally circular in cross-section and is of slightly smaller diameter than the end cap thereby defining a rim 26 on the end cap. The boss is frustoconical in configuration and has a circular aperture 27 in the centre. The underside of the endcap 24a is provided with an aperture 28 which connects the inner chamber of the end cap, within the boss 25 with the atmosphere.

A cylindrical spigot 29 is mounted within the chamber in the boss, the circumference of the spigot being slightly smaller than the circumference of the aperture 27 in the boss thereby allowing the spigot to move freely within the aperture. The end of the spigot within the boss is provided with a countersunk aperture and a rubber insert (not shown) is mounted in the aperture. The spigot has a groove 30 around the circumference thereof adjacent to the end of the spigot remote from the rubber insert.

A limit stop 31 is located adjacent to the spigot 29, the limit stop having a generally circular body 32 and a flat head 33, the head being received within the groove 30 in the body of the spigot. The head 33 of the limit stop is approximately a third of the height of the groove and therefore allows the spigot 29 to move within the aperture in the boss between two extreme positions in which the head of the limit stop contacts either the lower side of the groove or the upper side of the groove.

Bellows 34 are mounted within the shroud 21 of the absorber. The bellows are formed of a light-weight, flexible plastics material. The diameter of the bellows is slightly

less than the internal diameter of the shroud to allow the bellows to contract and expand within the shroud. The bellows are mounted over the boss 25 of the end cap 24.

5       The end of the bellows 34 remote from the cap is provided with a circular aperture 35. An actuation member 36 of the absorber is mounted on the bellows. The actuation member comprises a bifurcated body 37 having a generally circular end 38 with an aperture 39 corresponding in shape and size to the aperture 35 in the end of the bellows. A threaded bolt 40 passes through the aperture 39 in the body and the aperture 35 in the bellows and is retained in position by a threaded nut 41.

15      The other end of the body 37 is bifurcated to provide two arms 42, 43. A generally circular collar 44 is integrally moulded with the body where the arms join on the body. The diameter of the collar is slightly larger than the diameter of the actuating rod 19 to allow the actuating rod to be received  
20     in the collar.

25      An aperture 45 is provided through the end of each arm 42, 43 of the actuating member. A threaded bolt 46 is passed through the apertures and is retained within the apertures by a threaded nut 47 at either end.

30      The shock absorber 20 is mounted at the base of the bin 1 at the rear in a recess 48. The end cap 24 is placed over the end of the shroud 21, the bellows 34 are mounted in the shroud over the cap and the actuating arm 36 is attached to the free end of the bellows.

35      The actuating rod 19 is then passed between the arms 42, 43 of the bifurcated actuating arm and is received in the collar 44. The threaded nuts 47 are then tightened on the threaded bolt 46 to connect the shock absorber to the actuating rod.

When the lid 7 of the bin is in the closed condition, the bellows 34 are in the compressed condition as shown in Figure of the drawings. In this position the actuating member 36 is at the lower position within the slot 22 in the shroud 21.

5 When the lid of the bin is to be lifted to place rubbish into the receptacle within the bin, the pedal 15 of the bin is depressed which causes the pedal to hinge around the mounting pin 16. As the front of the pedal is lowered, the rear of the 10 pedal is raised thereby lifting the actuating rod 19. As the actuating rod is lifted, the end of the actuating rod contacts the underside of the rear of the lid 7a of the bin and lifts the lid clear of the top edge of the bin allowing access to the receptacle.

15 As the actuating rod 19 is lifted to lift the lid 7 of the bin, the actuating member 36 moves upwards together with the rod, through the slot 22 in the shroud 21 and pulls the bellows 34 upwards within the shroud 21.

20 As the bellows expand within the shroud, the spigot 29 is sucked from its seat within the boss 25 and is lifted until the head 33 of the limit stop contacts the lower edge of the groove 30 in the spigot, thereby preventing the spigot from 25 lifting further. Whilst the spigot is lifted free from the aperture 28 in the end cap 25, air is drawn in through the aperture and around the spigot into the bellows.

30 The lid 7 of the bin is held in the open condition whilst the operator's foot is on the pedal 15. In this condition, the actuating rod 19 is raised thereby holding the lid 7 clear of the upper surface of the bin.

35 When it is required to close the lid 7 of the bin, the operator releases the pedal 15 of the bin which hinges upwards towards the bin. As the front of the pedal moves upwards, the rear of the pedal is hinged downwards thereby lowering the actuating rod 19 to allow the lid to be lowered towards the

top of the bin and so causing a rapid compression of the air in the bellows. This in turn causes the cylindrical spigot 29 to be forced against its seat and so compressing the rubber insert and preventing escape of air in the chamber via the aperture 28.

This prevents the lid from slamming back into position, as the actuating rod 19 is lowered. During this time the actuating member 36 is lowered through the slot 22 in the shroud 21 thereby so that the bellows 34 are compressed within the shroud. However, once equilibrium has been reached in the bellows 34, the second stage of the lowering then begins with the compressed air in the bellows 34 slowly escaping through the aperture 28 controlling the decent of the lid through the final quarter of it's movement.

As the air in the bellows 34 is forced through the aperture 28 in the cap, the actuating rod 19 is slowly returned from the raised to the lowered position thereby gently lowering the lid 7 of the bin onto the top edge of the bin.

The weight of the lid 7 of the bin retains the bellows 34 in the compressed condition shown in Figure .

It should also be noted that for any particular arrangement the volume of air within the bellows 34 is determined by the mass of lid which has to have it's movement controlled. The cylindrical spigot 29 is weighted to prevent leakage of air under rapid compression but to allow controlled release under other conditions. The weight of the spigot compresses the rubber insert, but not overly thereby enabling the controlled release. Further when the bellows 34 are extended the spigot 29 is not too heavy to stay seated but moves to allow air through aperture 28 into the bellows 34, but is heavy enough to remain located in the boss.

Claims

1. A shock absorber adapted for use on a pedal bin in which the lid of the pedal bin is opened and closed by an actuating member, the shock absorber comprising damping means connected to the actuating means to limit the speed of movement of the actuating means when the lid of the bin is opened or closed.  
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- 10 2. A shock absorber according to claim 1, wherein the shock absorber comprises a body which is adapted to be mounted on the bin adjacent to the actuating means of the bin, the damping means being mounted within the body.
- 15 3. A shock absorber according to claim 2, wherein the damping means comprises bellows mounted which may expand or retract within the body.
- 20 4. A shock absorber according to claim 3, wherein means are provided to connect the bellows to the actuating member of the bin.
- 25 5. A shock absorber according to claim 4, wherein the connecting means comprises a planar member, one end of which is provided with a recess to receive the actuating member and the other end of which is connected to the leading end of the bellows.
- 30 6. A shock absorber according to claim 5, wherein the recess is defined between two arms of the planar member and means are provided to alter the distance between the two arms thereby altering the size of the recess to allow the connecting means to be securely affixed to the actuating means of the bin.

7. A shock absorber according to claim 5 or 6, wherein the body of the shock absorber is provided with a longitudinal slot along at least part of the length thereof, through which the planar member extends as the

5 bellows are expanded and retracted within the body.

8. A shock absorber according to any one of claims 5 to 7, wherein the body is provided with an end cap closing the end of the body remote from the planar member.

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9. A shock absorber according to claim 8, wherein the end cap comprises an integrally formed hollow boss which extends into the body and is received within the free end of the bellows.

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10. A shock absorber according to claim 9, wherein an aperture is formed in the outer surface of the end cap allowing air to be drawn into the hollow boss.

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11. A shock absorber according to claim 10, wherein a weight is provided within the boss, the weight being moveable between a position wherein the aperture in the end cap is closed by the weight and a position where the weight is lifted free of the aperture to allow air to be drawn into the boss.

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12. A shock absorber according to claim 11, wherein a limit stop is mounted on the boss to limit the movement of the weight between the two extreme positions.

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13. A shock absorber according to any one of claims 2 to 12, wherein the body is formed of a rigid plastics material.

14. A shock absorber according to any one of claims 3 to 13, wherein the bellows are formed of a resilient plastics material.

5 15. A shock absorber substantially as hereinbefore described with reference to and as shown in the accompanying drawings.



# The Patent Office

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**Application No:** GB 9720997.7  
**Claims searched:** 1-15

**Examiner:** Stephen Smith  
**Date of search:** 14 December 1998

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): A4A(AE)

Int Cl (Ed.6): B65D 43/26; B65F 1/16

Other: ONLINE:WPI

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 686598 (SHAKESPEARE) lines 57-63 of page 2	1-4
X	DE 4132958 A1 (LOBBERT) lines 37-45 of column 2	1-4
X	US 5082132 (TSAI) line 65 of column 2 to line 27 of column 3	1-4
X	US 3825215 (BORGLUM) lines 49-57 of column 2	1-4

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|---|---|---|--|
| X | Document indicating lack of novelty or inventive step   | A | Document indicating technological background and/or state of the art.  |
| Y | Document indicating lack of inventive step if combined with one or more other documents of same category. | P | Document published on or after the declared priority date but before the filing date of this invention.          |
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